# Professional Foresters Registration Examination

## APRIL 12, 2013

## PART I

**Instructions: APPLICANTS, PLEASE READ THESE INSTRUCTIONS CAREFULLY. You MAY complete PART I by doing ONE of the following two options:**

**A) Complete the Short Answer Section (Question 1) and Any Two (2) of the Essay Questions (Questions II through V)**

**OR**

**B) Complete Any Three of the Essay Questions (Questions II through V) and OMIT answering the Short Answer Question (Question I).**

Question I - Short Answer
Question II - Forest Mensuration
Question III - Forest Ecology
Question IV – Forest Economics
Question V - Forest Protection

Professional Foresters Registration
1416 9th Street, Room 1506-16
Sacramento, CA 95814

**Applicant #:_____**
**Question # __I_____**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

## ACRONYMS AND ABBREVIATIONS USED IN THIS EXAMINATION

The following Acronyms and /or Abbreviations **may be used** in this examination. Technical abbreviations that should be known by a forester are NOT included here (e.g. DBH, MAI, MBF). You may remove this page for reference throughout this examination. **It need not be returned.**

| Acronym or Abbreviation | Full Text |
|---|---|
| BLM | Bureau of Land Management, USDI |
| BOF | California State Board of Forestry and Fire Protection |
| CCR | California Code of Regulations |
| CDFFP or CAL FIRE | California Dept. of Forestry and Fire Protection |
| CDF&G | California Department of Fish and Wildlife |
| FPR | California Forest Practice Rules |
| | |
| PRC | California Public Resources Code |
| RPF | California Registered Professional Forester |
| THP | California Timber Harvest Plan |
| TPZ | California Timber Production Zone |
| USFS | United States Forest Service, USDA |

**Applicant #:_____**
**Question # __I_____**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

## QUESTION I - SHORT ANSWERS

4% 1. The Scribner Dec. C log rule differs from the International ¼" Rule in what basic way?

3% 2. On a cable logging system, explain the purpose of the haulback line.( If a diagram is useful, please include it with your answer.)

3% 3. What California law requires forest practice regulations to address archeological resources?

5% 4. List five (5) environmental or topographic settings that are common locations of prehistoric archeological resources found on California timberlands.

3% 5. You wish to thin a stand of trees to an average 50 ft x 50 ft square spacing. How many trees per acre would your thinned stand have remaining on the average acre?

3% 6. A plant that is more or less restricted to moist sites, but not considered an aquatic plant is termed a _____.

**CONTINUED NEXT PAGE**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

3% 7. According to the CCR, an approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the pre-harvest stand for integration into the post-harvest stand to achieve various ecological, social and geomorphic objectives is called

_____.

3% 8**.** In a standard township, what section is southwest of section 15?

4% 9. Define the term marginal cost.

4% 10. Next to the regulatory programs given below, give the correct name of the CA State Agency or Department that administers that program.

| CA Regulatory Program | CA Agency or Department |
|---|---|
| A. Streambed Alteration Review | _____ |
| B. Watershed Basin Plans | _____ |
| C. Off-Highway Motor Vehicle Recreation | _____ |
| D. Forest Slash Burning | _____ |

3% 11**.** In 2012, a bill was passed and signed by the governor (AB 1492) that made changes to the life of a THP. Currently what is the total possible effective period of a **new** THP signed after July 31, 2012?

2% 12. Certification of forestlands to attest that the management of such lands meets approved standards of an designated authority is common today. Give the **complete name** of two certification programs currently being used in the **United States.**

**CONTINUED NEXT PAGE**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

3% 13. A 25-ton load of fresh wood chips is delivered to a biomass co-generation facility. The load of chips has moisture content of 35%. How many dry weight tons in the load of chips?

4% 14. Assume that you are an RPF who prepared a THP for the plan submitter. Operations have commenced and been ongoing for three weeks. Due to a falling out with the plan submitter, you provide a written notice to the LTO and Plan submitter of your decision to withdraw professional services from the plan. What is the obligation of the LTO at this point?

4% 15. Using economics as the sole criteria to determine when a project or transaction is economically feasible, name a condition that must be met?

3% 16. List three life forms of **herbaceous plants** likely to be found in a forest type in temperate North America (common or scientific names are acceptable).

3% 17. **Silviculturally**, what is **usually** meant by an intolerant species? Include a common example of a tree species that is intolerant.

2% 18. Combustible materials that provides vertical continuity between vegetation strata and allows fire to climb into the crowns of trees or shrubs are commonly called _____

**CONTINUED NEXT PAGE**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

3% 19. Regional Water Quality Boards and the State Water Resources Control Board in California have the authority to require monitoring and reporting as a condition of any applicable waiver of waste discharge requirements on Timber Harvest Plans. What is the legislative basis for this authority?

3% 20. A deduction from taxable income, allowed under specific conditions, by U.S. tax laws to the owners of timber for reduction of original growing stock through cutting is called _____ .

3% 21. The California Forest Practice Rules (FPR) use Technical Addendums to convey certain procedures used to prepare Timber Harvest Plans. Briefly define areas covered by Technical Addendums.

3% 22. Dunning's Tree Classification is used to classify which species of conifers in the FPRs?

3% 23. A geomorphic feature formed by coalescing scars originating from landsliding and erosional processes caused by active stream erosion. The feature that is identified as the area beginning immediately adjacent to the stream channel below the first break in slope is termed an _____ .

4% 24. As used in the FPRs, what is meant by the term "Properly Functioning Salmonid Habitat"?

**CONTINUED NEXT PAGE**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

3% 25. In 2012, the Timber Regulation and Forest Restoration Fund was created. Explain how this Fund is fiscally supported and give two uses for the dollars in this fund.

3% 26. Which of the following tree species are susceptible to white pine blister rust: *Pinus monticola, Pinus lambertiana, Pinus ponderosae, Pinus sabiniana, Pinus attenuata, Pinus contorta, Pinus albicaulis*

3% 27. According to the FPR, which silvicultural method is used to develop an unevenaged stand from a stand that currently has an unbalanced irregular or even-aged structure. This method is used no more than twice to increase stocking and improve the balance of age classes so as to allow the residual stand to be managed by selection or group selection.

4% 28. List four purposes a THP document serves during its life:

**CONTINUED NEXT PAGE**

**Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.**

4% 29. To reduce current fuel hazard on timberlands, there are many different permitting options available that do not require a THP. Name two of these options that require the Quadratic Mean Diameter (QMD) of the remaining stand to be increased.

3% 30. An agreement between the Secretary of the Interior and either a private entity or another governmental agency, specifying the conservation that will be implemented in exchange for a permit that would allow the incidental taking of a threatened or endangered species is called a

_____

(Write out the entire answer, no abbreviations)

3% 31. List **three** compatible uses, besides tree growing and harvesting, that may occur on lands zoned TPZ, according to the California Yield Tax Law (disregard local or county defined compatible uses).

**END OF QUESTION AND ANSWER**

**END OF QUESTION**

## QUESTION II - FOREST MENSURATION

**OBJECTIVE**

The objective is to recognize and understand factors that may affect development of a suitable tree inventory method.

**SITUATION**

You have two clients interested in purchasing two separate tracts of wildlands. Each client has retained you to evaluate and inventory the tree inventory on the property for possible purchase. . Each owner is interested in long-term management of the tract they are interested in. (Tract descriptions follow the questions.)

**QUESTION**

40 % 1. For EACH of the tracts described on the next page, discuss and justify whether you would use variable radius (point) plots, fixed area plots OR a combination of variable radius and fixed plots to estimate current stocking and growth. Include in your discussion the appropriateness of the method when considering your client's goals.

2. The following inventory methods can be used in the prediction of future yield:

- Permanent sample plots (CFI)
- Re-inventory using independent plots (Separate inventories)
- Independent plots measured at one point in time (One-time inventory)

30 % A. Compare and explain the methods in terms of how volume is determined, accuracy of the resulting growth information, and treatment of in-growth and mortality.

30 % B. Justify which method you would use on each tract considering your client's goals.

**CONTINUED ON NEXT PAGE**

TRACT 1

A 15,000-acre tract of mixed conifer currently owned by another private landowner (not your client) located in the Sierra Nevada Mountains near Lake Tahoe. The terrain of the tract is a generally gentle slope and all age classes of timber are present. The current landowners have held the property for the last 50 years and have been actively harvesting the timber using single-tree selection and small group cuts. Your client is interested in purchasing this tract for the purpose of long-term timber management. The purpose of the timber inventory will be to determine standing inventory, stand growth, and project future yields if managed using the single-tree selection and small group cutting harvest systems.

TRACT 2

A 5,000-acre tract of foothill/woodland located near an urban area was burned in a wildfire 10 years ago. The terrain of the tract is generally gentle slopes and covered with 6-foot high brush, sprouting interior live oak, individual remnant ponderosa pine, ponderosa pine seedlings, and remnant California white and black oaks with seedlings in separate areas. Your client is a municipality interested in long-term watershed management of the tract. Purchase is almost certain as the municipality has been working on this with a land trust that purchased and currently owns the property. Because of the high value as an urban watershed they intend to use a variety of cultural treatments to enhance water yield, wildlife habitat and tree growth. They will be making periodic comparisons of the economic costs and benefits of each treatment.

**END OF QUESTION**

## QUESTION III-FOREST ECOLOGY

**OBJECTIVE**

To demonstrate your knowledge of forest ecology by predicting phases of **secondary succession after harvesting.**

**SITUATION**

Choose **ONE** of the Wildlife Habitat Relationship System vegetation types given below:

Sierra Mixed Conifer
Coast Redwood
Red Fir

Consider a small watershed in the forest type you chose from above. A tractor-yarding system will be used to clear-cut a portion of the area (30 acres in the Redwood, or 20 acres in the Sierra Mixed Conifer, or 10 acres in Red Fir areas). There will be no artificial reforestation practices applied and no forest treatment except site preparation in the form of slash disposal (broadcast burn on Redwood, or tractor pile and burn on Sierra Mixed Conifer and Red Fir). Assume that no stand replacement events occur for the next 100 years. As a knowledgeable forester you should be able to predict the development of secondary succession in the area for the following phases:

a. 3-5 years after cutting (regeneration phase)
b. 20-40 years after cutting (stem exclusion phase)
c. 70-100 years after cutting (gap succession phase)

**QUESTION**

(Make whatever logical assumptions are necessary to develop a complete answer, but be sure to state and explain the assumptions at the appropriate places in your answer. Common names are acceptable, but you may give scientific names where you feel clarification is necessary)

For **EACH** of the phases given above (a., b., and c.):

| | | |
|---|---|---|
| 15% | 1. | Discuss the structure of vegetation you would expect to be present in each age class. |
| 15% | 2. | Discuss the composition of vegetation you would expect to be present in each age class. |
| 40% | 3. | Discuss the five most important factors that affect the development of structure and composition for the specific vegetation type you have selected. |
| 30% | 4. | Discuss possible management problems for each age class presented by the developing stand. |

**END OF QUESTION**

## QUESTION IV-FOREST ECONOMICS

### OBJECTIVE

To determine your knowledge of the concept of financial maturity as it pertains to harvesting of even-aged timber stands and selection harvesting.

### QUESTION

40% 1a. Explain how financial maturity works when making decisions on the harvesting of EVEN-AGED timber stands.

20% 1b. Be explicit about the biological and economic information needed for determining financial maturity. List 5 valid information needs.

20% 2. Explain which factors, other than financial maturity, would be important in the "real world" situation of a timberland owner deriving income by selling stumpage from a 10,000 acre tract. (Do not consider the case of an owner who processes his own timber.)

20% 3. Explain how the concept of financial maturity, as discussed above, might be adapted to determine optimal lengths of cutting cycles and the levels of residual growing stock when timber stands are being harvested by a selection method.

**END OF QUESTION**

## QUESTION V- FOREST PROTECTION

**OBJECTIVE**

This question is to determine your knowledge of Best Management Practices (BMPs) and monitoring to evaluate the effects of forestry activities on water quality.

**SITUATION**

You are a field forester for a large industrial timberland owner. The company has holdings throughout the state; you work primarily on a 50,000-acre block of land. The timberland owner realizes that the state government is discussing monitoring and how to determine if current forestry practices are adequately protecting water quality. He explains to you that he has not had sufficient time to study and read about monitoring and needs to be informed about the subject. He requests the following information.

**QUESTION**

25% 1. Define "Best Management Practices" and explain how they relate to forestry projects. Give a **very brief** history of the State Board of Forestry's efforts to get the California Forest Practice Rules certified as BMP's and what the role monitoring was to play.

20% 2. There are two basic types of monitoring that can be done to determine if current practices are protecting water quality from significant degradation; they are called implementation and effectiveness monitoring. Describe these two types of monitoring.

25% 3. Specific to forestry, discuss hillslope monitoring including purpose, timing, and benefits and disadvantages as compared to in-channel monitoring. Give examples.

30% 4. Several state agencies have stated in written reports for selected Timber Harvesting Plans that they believe Crystal Creek, which is located in the middle of your division's holdings and contains anadromous fish, has been degraded by recent forestry operations. Inspections of the channel show that pools contain a high degree of fine sediment and spawning gravels are heavily embedded. Water temperatures have been found to reach 68°F. Devise a <u>simple</u> monitoring plan that could test whether recent operations are affecting the channel systems for these parameters. Be sure to state how they are being evaluated, when they are being evaluated, where they are being evaluated, and who is evaluating them. Also, state what you believe to be complicating factors in the monitoring plan (i.e., what factors will make it hard to determine if water quality is truly being adequately protected). [Note: You have a very small budget and very limited personnel time].

**END OF QUESTION**

# Professional Foresters Registration Examination

## APRIL 12, 2013

## PART II

**Applicant Must Answer Three Of The Remaining Five Essay Questions In Part II**

Question VI-Forest Engineering
Question VII-Silviculture
Question VIII-Forest Administration
Question IX-Forest Policy
Question X-Forest Management

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## QUESTION VI-FOREST ENGINEERING

**OBJECTIVE**

To determine your **analytical and planning** ability relating to road management and legacy logging road location in watercourse and lake protection zones.

**SITUATION**

You are faced with the alternative of whether to reconstruct a one-half mile segment of an existing road or to construct a new road upslope outside of the watercourse protection zone. This road will provide access for a logging operation in the near future and also provide access for continued, future timber operations.

The climate is temperate and can have storms that exceed 4 inches of precipitation within a 24-hour time span in a 5-year return period.

The existing road was built in 1985 as a single lane spur with a nearly constant grade of 3% with insloped drainage using an inside ditch and culverts for cross-drains. It was built just outside the boundary of the watercourse protection zone prescribed at the time of construction. After more than a decade of intermittent use, this road has been blocked for the last 15 years by three sediment-plugged cross-drains resulting in fill washouts. There is an additional washout where a tributary Class II stream crosses this road segment. (A new road would also, obviously, cross the tributary Class II stream upslope.) The road surface has become vegetated with native grass, forbs, and brush and is in generally stable condition.

Slopes adjacent to the existing road range from 20 to 35 percent and increase to 40 percent or more within 100 feet upslope from the existing road surface. Soils in the area are 30 to 50 inch deep unconsolidated, coarse, non-cohesive soils developed from weathered granitic parent material.

**QUESTIONS**

30% 1. Discuss both the beneficial and detrimental aspects of each road alternative. Give at least 3 factors to be considered under both the good and the bad. Feel free to discuss additional aspects and solutions that you may need to consider in reaching a decision.

15% 2. Describe any site condition(s) requiring special care in design or mitigation.

25% 3. List and briefly describe five (5) measures that you would include in your plans to mitigate potential environmental problems. Indicate whether the mitigation applies to the new road, the use of the old road, or both.

30% 4. Identify and justify the road option you would select. State the assumptions that lead to a logical and defensible selection. (Economic justification alone is not adequate.)

**END OF QUESTION**

## QUESTION VII-SILVICULTURE

**OBJECTIVE**

To determine your understanding of the methodology of developing a silvicultural prescription.

**SITUATION**

A stand management prescription is an outline of all of the silvicultural treatments that are to be applied to a stand (and its aggregations where stand structure is complex). A prescription must state the objectives that are to be achieved by treating or not treating the stand, and the sequence of changes that can be expected to follow the first and subsequent entries. Also, the prescription must describe the treatments required to produce the desired stand structure and composition.

Consider a timber stand to be managed on an even-aged basis for the long term production of high quality sawtimber and the following conditions:

A. Overstory: 100% Douglas-fir, average age 100 years, 80 square feet of basal area per acre, 140' average tree height, 24" average dbh, 25 trees per acre, 30% of the total crown cover.

B. Intermediate stand layer: 60% Douglas-fir, 60 square feet basal area per acre and 40% white fir, 40 square feet of basal area per acre, 50' to 80'average height, 13" average dbh, 110 trees per acre, 60% crown cover., average age of both species = 45-55 years,

C. Understory: 50% white fir, 20% Douglas-fir, 10% incense- cedar, 10% ponderosa pine, 10% sugar pine, average age 15-30 years, average height 6' to 30', 4" average dbh, 450 trees per acre, 60% crown cover.

**QUESTIONS**

20% 1. Project the existing stand 50 years into the future without treatments. Describe this hypothetical future stand in terms of structure and composition.

20% 2. Beginning in the present, OUTLINE what treatments you would prescribe (from a strictly silvicultural standpoint) for this stand through this and the next full rotation. Clear cutting is not an acceptable regeneration method for this project. You may wish to draw a treatment time-line graph to help illustrate your answer.

60% 3. Discuss the objectives you used in determining each treatment and describe the sequence of changes that occur in terms of stand composition and structure before and after treatments. Be specific when discussing stocking, composition, growth etc. and include your assumptions.

**END OF QUESTION**

## QUESTION VIII- FOREST ADMINISTRATION

**OBJECTIVE**

To determine your ability to develop a reasonable course of action relating to a forest assessment project.

**SITUATION**

You are a self-employed consulting forester having just earned an RPF's license. The telephone rings and a potential client seeks your services. His uncle has passed away and left him about 640 acres of California timberland. The potential client does not know where the area is located, but does have a legal description. He knows that the land has been logged in the past by his uncle; well over 30 years ago. The potential client now thinks he may want to log the area and needs an assessment of the condition of the property and timber, estimated costs of harvesting and potential revenues. He is willing to spend up to $8,000 to find out this information and needs to know the answer to these questions within three weeks in order to tell the IRS if he can pay the estate tax by harvesting the timber, or if he must sell the land outright to pay the taxes. He says that he will rely heavily on your professional expertise. You decide to take the job and he agrees to become your client.

**QUESTIONS**

60% 1. What course of action do you follow from this point **prior** to making a field inspection of the property? (Include the consequences of working within the given limitations, possible resources upon which you can draw for information for the project, your overall approach to the project, and how you would handle unresolved items?)

20% 2. Upon visiting the property, what information will you get in order to answer the client's questions regarding the condition of the property and timber?

3. In order to estimate the potential income for your client:

10% a. What information will you gather in the field to help you decide what harvesting system to use on this area and to determine estimated harvesting costs?

10% b. What other information will you need before you can determine the potential income from immediate harvesting of the property?

**END OF QUESTION**

## QUESTION IX- FOREST POLICY

**OBJECTIVE**:

To evaluate your understanding of Federal Laws that effect private forests in California and other states.

**SCENARIO**

Private forestry operations are regulated by a fairly complex set of laws, regulations, and non- regulatory policies at the federal, state and local level. The resulting framework can be fairly complicated and can vary widely between jurisdictions. While RPFs are expected to understand State of California forest practice regulations and policy, They are also expected to understand certain Federal laws that also must be understood and complied with in forestry operations in California.

**QUESTIONS**

50% 1. The **Federal Clean Water Act.) is arguably the predominantly federal law impacting private forest land operations.** Write a relatively complete explanation of what this Act or set of Regulations covers and how these laws have been implemented in California for forestry on private lands from a RPF's standpoint.

50% 2. Listed below are four other Federal Acts, write a relatively complete explanation of **TWO** of these acts and how these laws have been implemented in California for forestry on private lands from a RPF's standpoint. . Discuss what each Act or set of Regulations covers and how these laws have been implemented in California for forestry on private lands.

A. Clean Air Act
B. Endangered Species Act
C. Insecticide, Fungicide, and Rodenticide Act
D. Coastal Zone Management Act

**END OF QUESTION**

## QUESTION X- FOREST MANAGEMENT

**OBJECTIVE:**

This question will evaluate your understanding of basic forest management concepts having to do with stand growth.

You must answer these questions with both written explanations and definitions and graphs. For the graphical illustrations, please draft them on the graph sheets provided for your use. You may remove them from the examination packet, for ease of use during the examination, but YOU MUST hand in the graph sheets with your written answers. Be sure to place your Applicant's Number in the provided space on the graph sheets. Be sure to adequately label graph axes with titles, units, and/or values so as to make your graph understandable and to insure that it truly aids in understanding your written answer.

**QUESTIONS**

1. Assume that you are depicting the following attributes for an even-aged stand of Douglas-fir. Further assume that no intermediate stand manipulations will be done.

10% A. On a single graph, depict what the number of trees per acre per diameter class would look like at 40, 80 and 100 years. Explain what is happening in biological terms. (Note-Graders will be looking for a correct answer that is in the "ball-park" as to numbers of trees being depicted and relative changes in number of trees as the stand ages, not exact numbers.)

5% B. What stand management technique commonly performed attempts to take advantage of the biological behavior you have described in 1A above?

10% C. Depict a graph of total stand growth volume per acre as a function of stand age. Define the term total stand growth and explain why your graph behaves in the way you have drawn it.

20% D. On a single graph, depict typical curves for periodic annual growth increment (PAI) per acre and mean annual growth increment (MAI) per acre. Clearly label which curve is PAI and MAI. Define the terms and explain why the curves behave in the way and position you have drawn them.

15% E. Explain and define the concept of culmination of mean annual growth increment and the age that it occurs for a stand. Does this concept apply to both even-aged and uneven-aged stands? Explain and justify your answer.

**CONTINUED NEXT PAGE**

20%  2A. Assume that you are interested in expressing the above concepts in relation to useable or net volumes, rather than total volumes. Explain the affect that switching from a total volume basis to a net volume basis would have on the calculation of the age of the culmination of mean annual increment.

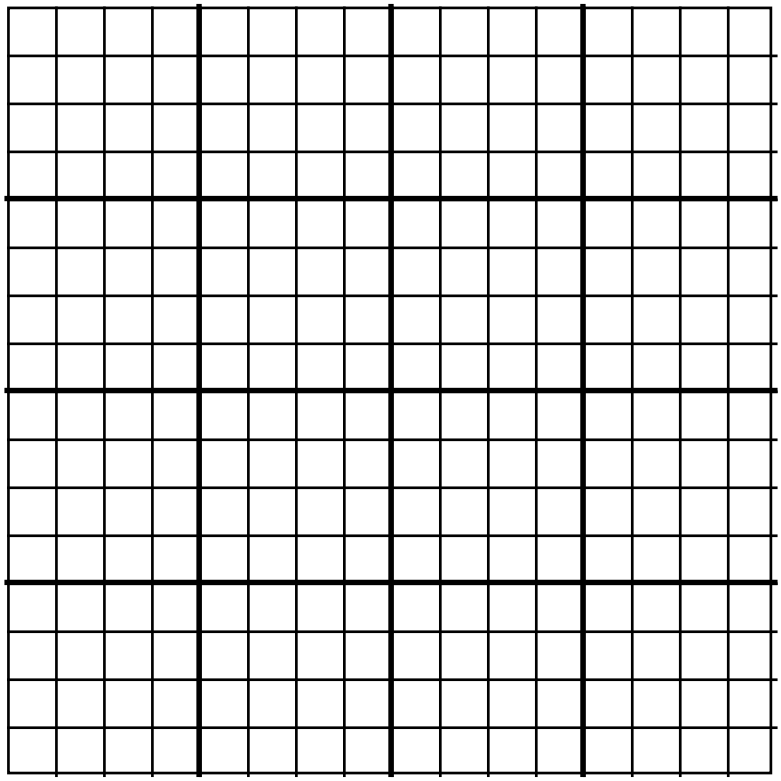
20 %  2B. Assume that your management plans include a change in volume rule from Scribner Board Feet to Cubic Feet or from a minimum top diameter of 8-inches to a minimum top diameter of 4-inches. Explain the affect that switches in utilization standards such as these would have on the calculation of the age of the culmination of mean annual increment.

**END OF QUESTION**

**GRAPH FORMS FOLLOW.**

**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION**
**APPLICANT NUMBER _____**

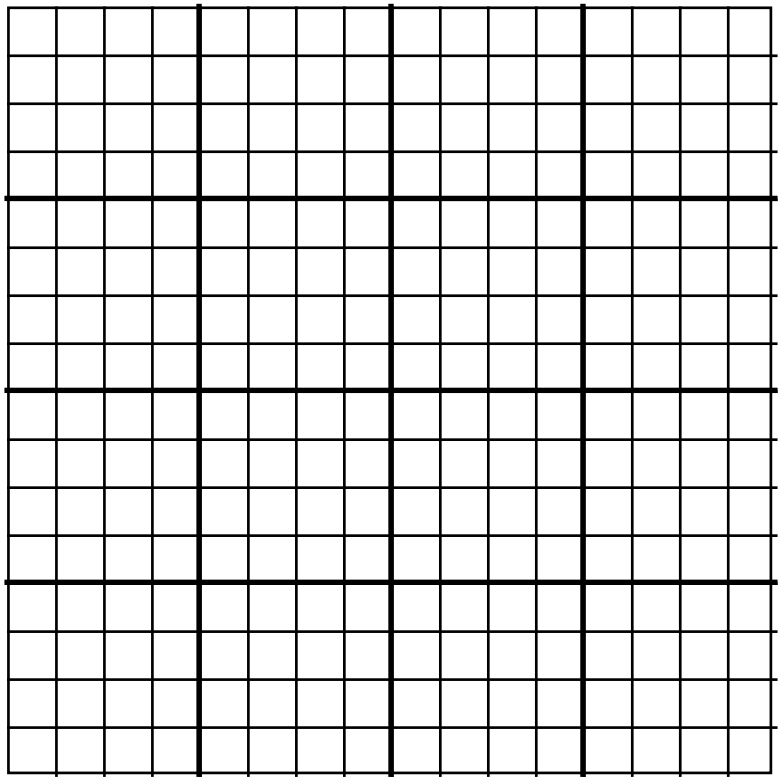
**GRAPH FOR QUESTION 1A & B**



**HAND IN WITH ANSWERS AND EXAM**

**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION**
**APPLICANT NUMBER _____**

**GRAPH FOR QUESTION 1C**



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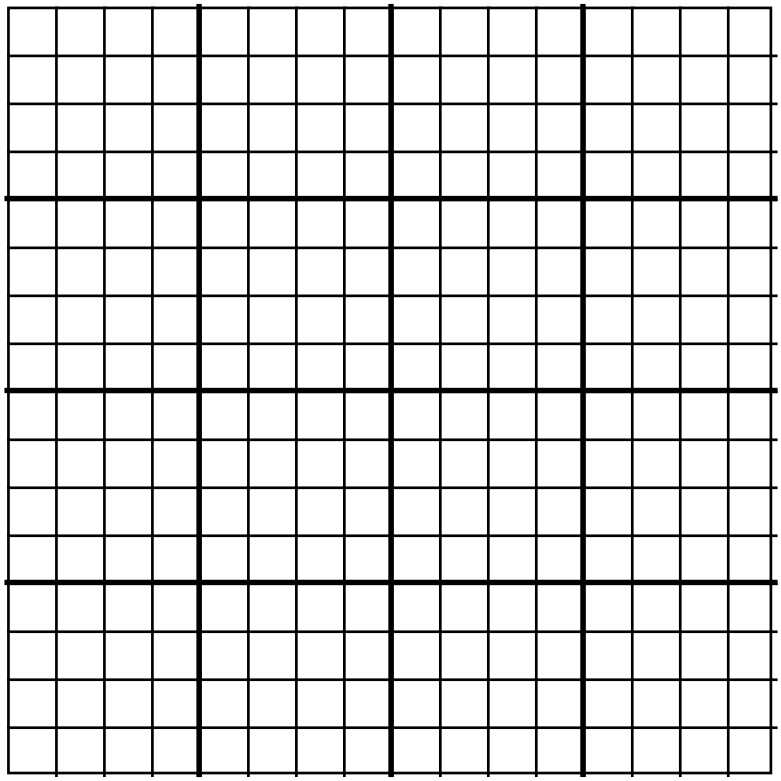
**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION**
**APPLICANT NUMBER _____**

**GRAPH FOR QUESTION 1D**



**HAND IN WITH ANSWERS AND EXAM**

**END OF QUESTION**

# END OF EXAMINATION